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The Lost Worlds of Messmore & Damon: Science, Spectacle & Prehistoric Monsters in Early-Twentieth Century America

Abstract: In 1924, the model-making company Messmore & Damon, Inc. of New York unleashed their masterpiece: the Amphibious Dinosaur Brontosaurus, a moving, breathing, roaring animatronic dinosaur, based on displays in the American Museum of Natural History. Over the 1920s and 1930s, this became the focus of an ever-increasing publicity campaign, as Messmore & Damon exhibited prehistoric automata in department stores, the media, and the Chicago World Fair of 1933–34. These displays were hugely popular and widely discussed, drawing from the increasing public appeal of paleontology. Mixing commercial entertainment with invocations of scientific value, Messmore & Damon's prehistoric creations offer a window into the meaning and popularity of deep time sciences in early-twentieth century America, and the links between science and spectacle in this period.

Introduction

The early-twentieth century was a time when all things prehistoric became entrenched in the public imagination in the United States and Europe. The remains of huge sauropod dinosaurs were unearthed in the American West in what Paul Brinkman has termed “the Second Jurassic Dinosaur Rush,”¹ and their mounted skeletons were erected in major museums to great sensation, becoming important means of marketing natural science. Dinosaurs also spread into mass culture, through newspaper stories, popular science works, cartoons, and shows and feature films, like Winsor McCay's *Gertie the Dinosaur* of 1914 and *The Lost World* of 1925. As W. J. T. Mitchell has argued, this was when the dinosaur became “the totemic animal of modernity,” mixing science, commerce, monstrosity, and wonder.²

Other fields saw similar developments, and Constance Clark has highlighted the multiple uses of the “cave man” in American popular and scientific culture over the 1920s, which resonated with debates over evolution, religion, and degeneration, and the tense relations

¹ Paul Brinkman, *The Second Jurassic Dinosaur Rush Museums and Paleontology in America at the Turn of the Twentieth Century* (Chicago: University of Chicago Press, 2010); “Bully for Apatosaurus,” *Endeavour* 30, no. 4 (2006): 126–30; Ilja Nieuwland, “The Colossal Stranger: Andrew Carnegie and Diplodocus Intrude European Culture, 1904–1912,” *Endeavour* 34, no. 2 (2010): 61–68; Lukas Rieppel, “Bringing Dinosaurs Back to Life: Exhibiting Prehistory at the American Museum of Natural History,” *Isis* 103, no. 2 (2012): 460–90.

² W. J. T. Mitchell, *The Last Dinosaur Book: The Life and Times of a Cultural Icon* (Chicago: University of Chicago Press, 1998).

between science and the media during the Scopes trial.³ Both Brinkman and Clark note that the relations between science and spectacle in this period were essential but tense, as “museum paleontologists faced a continuous conflict between enticing visitors by catering to popular tastes and educating them with legitimate scientific content.”⁴

The often tense relations between paleontological science and spectacular display has been well highlighted. However, studies of these dynamics have tended to focus on scientific or museum contexts. The case of Messmore & Damon, Inc. offers an interesting counterpoint. This commercial company constructed a whole menagerie of prehistoric automata and sought to take advantage of the growing appeal of paleontology and prehistory. Messmore & Damon presented dinosaurs and prehistoric animals through ever-evolving displays and in a range of contexts, and these were seen by hundreds of thousands of people in the United States, Canada, and France. Their creations were designed to mix commercial spectacle, novel technology, and narratives of life’s development. Although not always successful and often meeting technical, commercial, or publicity hitches, Messmore & Damon’s prehistoric spectacles show how explicitly commercial showmen used both scientific and public appeal to push paleontological imagery into the wider domain.

Designing the Dinosaur

The partnership between James Messmore and Joseph Damon began far from paleontology. Messmore was the son of vaudeville performers from Detroit, and moved to New York in the 1900s. Working as a prop man at the Metropolitan Opera, he became a self-taught inventor of animated exhibits, apparently starting with a mechanical monkey, and moving to larger, more complex creations. Damon meanwhile initially worked as a butcher’s assistant in Illinois (he later claimed this gave him good understanding of animal anatomy and articulation), before gaining a scholarship to the Arts Students League in New York. According to company mythology the two—struggling prop-man and struggling artist—met on a job at a drinks machine, and, upon discovering common interests, went into business.

The two set up a workshop at 404 West 27th Street in 1916, combining Messmore’s skills in constructing mechanical automata with Damon’s in artistic modeling. They were able to profit from the great demand for animated spectacles from numerous sectors of New York’s

³ Constance Clark, *God—or Gorilla: Images of Evolution in the Jazz Age* (Baltimore: Johns Hopkins University Press, 2008).

⁴ Brinkman, *Second Jurassic Dinosaur Rush* (ref. 1), 249. Clark, *God—or Gorilla* (ref. 3), 213–14. See also Victoria Cain, “The Art of Authority: Exhibits, Exhibit-Makers, and the Contest for Scientific Status in the American Museum of Natural History, 1920–1940,” *Science in Context* 24, no. 2 (2011): 215–38.

commercial life. Messmore & Damon were commissioned to make floats featuring “grotesque heads” and fairy-tale characters like the Old Lady who Lived in a Shoe for parades to mark Easter, Christmas, and the raising of war bonds. Department store displays were a particularly large source of business, especially during the busy Christmas season. Since the late-nineteenth century, stores like Macy’s and Gimbels competed to attract customers with ever more spectacular window displays, and by the early twentieth century sophisticated electrical and animated productions had become staples of urban commercial culture.⁵ Messmore & Damon created clowns, Santa Clauses, and ancient Egyptian scenes to draw in the holiday crowds. Their series of elephants helped secure their reputation as some of the most prominent makers of animatronic attractions in New York City.

To maintain standing in this competitive sector required continual one-upmanship. The construction of the elephants therefore posed a potential problem: what next after replicating the largest living land animal? In a story later presented in a company publicity sheet, the solution apparently struck the pair while wandering downtown New York:

One day M&D were walking down the street and they saw an excavation job going on with a huge steam shovel at work. The boys could visualize the frame work for a huge prehistoric monster, moving, breathing, growling and fighting. Together they went to the American Museum of Natural History and carefully looked over the fossilized remains of a prehistoric dinosaur which had been found in Medicine Bow, Wyo. This skeleton measured around 60' from end of the nose to the tip of the tail, and after surveying it carefully they concluded it was the one for them to reproduce.⁶

Although this story is possibly apocryphal, it illustrates some important points. First, it indicates contemporary “dinomania,” with prehistoric beasts being familiar enough by the 1920s to immediately appear as sources of inspiration. Perhaps more interesting is the connection between dinosaurs and modern technology. Public perceptions of the larger dinosaurs frequently linked them with new innovations. Images promoted since the 1890s showed sauropods walking down modern streets, peering into high-story windows, and smashing trains and tramcars. In terms of museum research, the mounting of large dinosaurs also drew from contemporary

⁵ William Leach, *Land of Desire: Merchants, Power, and the Rise of a New American Culture* (New York: Vintage Books, 1993); Gary Cross, *The Cute and the Cool: Wondrous Innocence and Modern American Children’s Culture* (Oxford: Oxford University Press, 2004), 95–99; William Bird, *Holidays on Display* (Washington DC: Smithsonian Institution, 2007).

⁶ “It’s Ballyhoo,” Box 2, Folder 19: The World a Million Years Ago (development), 1924–1932. Collection 0846: Messmore & Damon, Inc. Company Records, Archives Center, National Museum of American History, Smithsonian Institution, Washington DC [hereafter: M&D Records].

industrial technology—a point made by Lukas Rieppel.⁷ The strong but surprisingly light bones of sauropods were often likened to skyscraper girders, and the mounting of their large skeletons was a technical challenge drawing inspiration from modern architecture and sculpture. Dinosaurs and technology were closely linked, connecting the modern and the primordial.

INSERT HERE: Figure 1: “Group of children with Brontosaurus (1927).” Image Number 312229. American Museum of Natural History Library.

The connections between technology, paleontology, and commercial spectacle formed the basis for the design and construction of Messmore & Damon’s dinosaur. They always emphasized that it was based on a single specimen: the *Brontosaurus excelsus* at the American Museum of Natural History. This had been unearthed in Wyoming in 1899 and put on display in 1905, to great public interest.⁸ Messmore and Damon not only examined the specimen, but reportedly engaged scientists at the AMNH, including Roy Chapman Andrews, Walter Granger, and Barnum Brown, to check over their reconstruction and give precise anatomical measurements. Although connections between Messmore & Damon and museum scientists at this stage is impossible to verify, a good relationship certainly developed later. In 1932, Roy Chapman Andrews visited Messmore & Damon’s workshop with Walter Granger and wrote a letter (which was widely used in the company’s publicity) stating that: “Both of us were delighted with the ingenious reconstructions of prehistoric animals which they are making. We were glad to see that they were doing it in a really serious way and making great efforts to have the models as accurate as possible. Dr. Granger and I feel that this has great possibilities educationally. It almost makes fossil animals live and I look forward to the time when our scientific museums will have exhibits of this sort.”⁹

This reflects the interchange between commercial spectacle and paleontological science—among some of the popularizers of paleontology at least. Although the museum’s director, Henry Fairfield Osborn, grew increasingly concerned with “commercial taint” over his career,¹⁰ the parallels between department store organization and new techniques of museum display have

⁷ Rieppel, “Bringing Dinosaurs Back to Life” (ref. 1).

⁸ The mounting of this specimen is discussed in Brinkman, *Second Jurassic Dinosaur Rush* (ref. 1), 86–88, 236–40.

⁹ Roy Chapman Andrews to Commander Langworthy, 14 December 1932, A51: Roy Chapman Andrews Administrative Papers, Box 11, AMNH Central Archives, New York.

¹⁰ Noted in Clark, *God—Or Gorilla* (ref. 3), 35.

been noted in several works.¹¹ Although the relationship was often controversial, many scientists at the museum experimented with commercial and media engagement. Andrews was a particularly notable public promoter of natural history and paleontology. In the 1920s he led (and also fundraised for) the AMNH's Central Asiatic Expeditions into Mongolia, which took advantage of advertising, commercial sponsorship and public subscriptions, and emphasized the power of American technology and organization to unearth the unknown fauna of Inner Asia. Andrews' strategies, although controversial among many of his contemporaries and coworkers, remained a viable strategy in this period. Messmore & Damon's use of the Brontosaurus gives a further example of cross-fertilization. Paleontology and industrial capitalism were linked both at the AMNH and West 22nd Street.

The dinosaur was constructed in Messmore & Damon's workshop over eleven months, at a cost of \$35,000. The model had a rattan and bamboo skeleton, overlaid with a hide of shellacked felt held together by large zippers and buttons. The finished construction was forty-seven feet long, weighed three and a half tons, and was powered by a series of motors to give twenty-two different movements. The intention was to construct as lifelike a model as possible, maximizing the dramatic potential. It was not just designed for size, but according to marketing principles. Messmore explained to *Nation's Business* magazine in 1925:

Back of it all, of course, is the job of attracting crowds. We have, consequently, when animals are set up, mingled with the spectators in an effort to find out what interests them particularly.

The first principle of getting a crowd to a window or toy display is a sweeping motion that will attract the eye. After that, the spectator is interested in details. He will marvel at the quivering of the nostrils, when that probably has been the easiest thing to supply. The real job, perhaps, has been in providing the sweeping motion, as with the neck of the dinosaur.¹²

These techniques can be seen in the construction of the dinosaur. The focal point was the long neck, which provided just the dramatic sweeping motion discussed above, and was reinforced by a similarly swinging tail. To encourage closer observation, there were also small moving details around the face: the eyelids blinked, eyes rolled, and mouth opened. Interior

¹¹ Leach, *Land of Desire* (ref. 5), 164–73; Tony Bennett, *The Birth of the Museum: History, Theory, Politics* (London: Routledge, 2013); Michelle Henning, *Museums, Media and Cultural Theory* (Maidenhead: Open University Press, 2005).

¹² Donald MacGregor, "Dinosaurs and Elephants to Order," *Nation's Business*, August 1925. Box 8, Folder 2: Scrapbook, 1922–1934. M&D Records.

motors caused the sides of the animal to inflate and deflate, giving the impression of breathing. It even made noises. The mouth contained an amplifier wired to a hidden phonograph record, which played a loud bellow inspired by the animal's name. A Messmore & Damon employee stated in a radio interview: "Brontosaurus means thunder lizard and we decided a thundering noise would be proper for this beast. So we recorded a thunder storm, and run it backwards thus producing the queer rumbling noise you will hear from this animal."¹³ Everything was constructed to maximize the drama and mix science with commercial imperatives.

The company was understandably secretive around how this centerpiece was designed and controlled. Most press reports described it being operated electronically via a switchboard, with a single operator "well concealed at a distant point ... He can make the dinosaur act as though he has 'a brain of his own,' doing whatever he wishes."¹⁴ However, it is unclear if this is accurate, or whether it was a ploy invoking the "wizardry of electricity" to hide the real operation.¹⁵ The patent granted in 1933 made no references to a switchboard, but instead stated that the operator "is hid within the body ... and provides the amusement for the crowd outside" manipulating a series of pulleys and levers in a more mechanical manner.¹⁶ However the dinosaur was controlled, it was remarkably dexterous, particularly in its combined neck and mouth movements. Reports would continually discuss its interaction with crowds, as it grabbed hats and newspapers from unsuspecting observers, and even smoked cigarettes passed into its mouth. It was not just a spectacle to be observed, but an automated creature to be interacted with.

INSERT HERE: Figure 2: Messmore & Damon and the "Amphibious Dinosaur Brontosaurus," Box 33. Messmore & Damon, Inc. Company Records, Archives Center, National Museum of American History, Smithsonian Institution [Hereafter M&D Records].

INSERT HERE: Figure 3: Patent Images of the Mechanical Dinosaur. Box 10, Folder 2. M&D Records.

¹³ "Broadcast: WCAE Pittsburgh," Box 7, Folder 6: Scrapbook (World War II-related), 1933–1942. M&D Records.

¹⁴ Francis B. Messmore (Fordham University), "The Synthetic Dinosaur Brontosaurus," Box 1, Folder 2: Synthetic Dinosaurs Brontosaurus (academic paper, Fordham University), circa 1940s. M&D Records.

¹⁵ Messmore & Damon were very protective of their intellectual property and filed a lawsuit against Earl Carroll for infringing on their patent with his own mechanical dinosaur.

¹⁶ "Inventor: George H. Messmore, Title: Head Movement for a Device Simulating a Dinosaur or Other Animal," Box 10, Folder 2: Head movement for a device simulating a dinosaur (US Patent 1,898,587 and British Patent 387,199), 1931–1933. M&D Records.

Prehistoric Shows

The dinosaur blended new technologies, museum science, and consumer culture. However, it posed problems, having not been commissioned by any client, and being too expensive to sell. Later, Messmore confessed “I had no idea what I was going to do with it. My friends said I was going nuts, but I told them I’d at least have a Brontosaurus for a little playmate.”¹⁷ It was therefore a gamble, drawing off the ratcheting competition between manufacturers of spectacular automata, and needed to be deployed somewhat experimentally. Renting the dinosaur out proved the most viable way of generating money. Following Messmore & Damon’s track record in window displays, the primary customers were department stores, and the first exhibits demonstrated that the gamble had paid off. The dinosaur made its first appearance in Newark, New Jersey, over Christmas 1924, and Messmore highlighted that “the dinosaur, according to the store’s own figures, drew 400,000 persons during the Christmas buying season.”¹⁸ In the next few years, it was exhibited across the northeastern United States and Canada. The dinosaur was usually placed in a jungle environment, initially alongside modern animals for a sense of scale. However, it was soon joined by two other prehistoric creatures, both modelled on existing Messmore & Damon creations. The first was a mammoth, a scaled-up version of their mechanical elephant, clad in the skins of 350 goats. Another dinosaur, the Triceratops, was developed in 1926, modelled on their rhinoceros automaton.

Wherever the dinosaur and its prehistoric companions went, they gained a great deal of media attention, featuring in the local press and radio spots. As well as being commercial spectacles, they were also presented as promoters of scientific knowledge (although this often took a jocular form). The dinosaur was usually billed as the “Amphibious Dinosaurus Brontosaurus,” an exaggerated and incorrect name seemingly chosen to resonate with public ideas of scientific terms being overly long, Latinate and complex. Despite this mangling of the terminology, the displays were continually presented as both thrilling and informative. When the show went to Montreal, one newspaper called the dinosaur “scientifically perfect in every way” and “an educational privilege not to be missed ... not only exhibiting the animals as in a museum, but wonderfully animated by their complicated machinery.”¹⁹ Claims for scientific authenticity were a key part of the attraction.

¹⁷ *New York World Telegram*, October 18, 1958. Box 1, Folder 6: Newspaper and Magazine Clippings, 1925–1996. M&D Records.

¹⁸ Donald MacGregor, “Dinosaurs and Elephants to Order,” *Nation’s Business* 1925. Box 8, Folder 2: Scrapbook, 1922–1934. M&D Records.

¹⁹ “Crowds throng to ‘Jungleland,’” *Montreal Gazette*, no date. Box 6, Folder 3, 1–10, 1925–1932. M&D Records.

Press reports would often describe the prehistoric animals in terms of shock and horror, resonating with stereotypes of fearsome monsters, but also highlighting the power of technology to create the illusion of life. The correspondent in the *Literary Digest* was somewhat unnerved, noting how “those who have seen the Great Amphibious Dinosaur Brontosaurus in action declare that the semblance of life is too real to be pleasant and confess an impulse to make sure of a ready exit in case of eventualities.”²⁰ Occasionally health alerts were given. When the “prehistoric zoo” was advertised in Winnipeg in 1926, it was prefixed with “WARNING: Children that are inclined to be nervous or hysterical should be informed that these animals are harmless, as to them their size and appearance may prove terrifying.”²¹

Public reactions could be more complex. Several department stores paired the exhibit with children’s essay competitions, usually asking for entries along the lines of “What would a live dino do if it came down the street to-day?,” following the contemporary trope of dinosaurs coming face-to-face with modern urban settings. Although most have not survived, some newspapers did publish extracts. The Toronto newspapers for example noted that “most of the children’s essays ... express fear and excitement at what a live dino would do,”²² batting away cars or needing to be “killed by aeroplanes.”²³

An essay in a competition organized by Morgan’s department store in Montreal (which served as the basis for an entire article in the *Montreal Gazette*) was more sympathetic. It described how “the midday crowd ... hurrying along St. Catherine street, was paralyzed by the sudden looming up of a creature the size of a well grown battle cruiser, who stepped over the tops of automobiles and gently pushed street cars off the tracks.”²⁴ Yet rather than describe a continuing swathe of destruction, the story took a poignant turn:

The monster sidled up to a traffic “cop” and rested its head affectionately on his shoulder. The cop inclined a sympathetic ear. Two large tears dropped from the animal’s eyes. The policeman’s overcoat looked as if he had just emerged from the pond in Lafontaine Park, but he nobly stood his ground.

The dino inquired for the roomy swamp which had been his lair, and complained that he could find none of the luscious slimy vegetation which he

²⁰ “Moving Model of a Brontosaur,” *The Literary Digest*, November 21, 1925. Box 8, Folder 2: Scrapbook, 1922–1934. M&D Records.

²¹ “Prehistoric Zoo, Nature’s Monster Animals When the World Was Young Displayed in Replica, 7th Floor,” no date or source. Box 8, Folder 2: Scrapbook, 1922–1934. M&D Records.

²² “‘Dino’ Good Company for Baby Stella?,” *Toronto Daily*, no date. Box 8, Folder 2: Scrapbook, 1922–1934. M&D Records.

²³ “Destroys Warehouse, Jumps into Lake,” *Toronto Star*, no date. Box 8, Folder 6: Scrapbook (A World A Million Years Ago), 1935. M&D Records.

²⁴ “Crowds throng to ‘Jungleland’” (ref. 19).

required in helpings of several hundred pounds for a square meal during his terrestrial sojourn, some few million years ago.

“Everything’s changed!” he sobbed piteously upon the policeman’s shoulder.

The dinosaur was then met by a man from Morgan’s department store, taken to “Jungleland,” and played happily “with crowds of admiring children ... performing like a trained doggie, and seeming quite happy again, his sides heaving gently as if he had at last found a satisfying meal.” In this case, terror at the creature’s size and power was only a surface reaction. The deeper point was empathy with this prehistoric monster, and reflection on the environmental change which had occurred since the times of the dinosaur.

The dinosaur’s largest early presentation was in Messmore’s native Detroit in 1929, when it was exhibited in the showroom of the Richards-Oakland automobile company. The theme of this display was intended to be “the History of Transportation,” a series of dioramas showing the “progress” of transport in North America from the “American Indian brave” through prairie wagons to modern planes and automobiles. However, the entrance was dominated by the Brontosaurus and Mammoth, as examples of the type of “transport” which existed before humanity (again linking prehistoric animals with modern technology). In the media reports, the dinosaur overshadowed the history of transport by some margin, and proved hugely popular. When the exhibit closed, Richards-Oakland wrote to Messmore & Damon on how “the Dinosaur, Mammoth, etc., created no end of interest and we were able to put through our Showrooms some three hundred and fifty thousand people in three week’s time.” Automobile sales had quadrupled and “this display was one of the answers to a salesman’s prayer.”²⁵

INSERT HERE: Figure 4: Detroit Sunday Times, 10 March 1929. Box 6, Folder 12. M&D Records.

The Detroit exhibit was also linked with contemporary politics. In one of the radio shorts, the dinosaur was presented as important for educating responsible citizens: “the more we know about the past the better we appreciate the present and can envision the future. And the informed man and woman and child is the better citizen.”²⁶ Knowledge of development, stretching back into geological time, were was a part of public education. Other spots made analogies with Prohibition, including several jokes along the lines of “if a gentleman out late at

²⁵ Richards-Oakland Company to Messmore & Damon, 1 May 1929. Box 2, Folder 19: The World a Million Years Ago (development), 1924–1932. M&D Records.

²⁶ “#1 Radio Talk for Transportation Show,” Box 6, Folder 3. M&D Records.

night with a few pre-Volstead imbibitions aboard would have a lot to explain if he said he saw anything like old Dino in the front yard.”²⁷ However, they were also used to explain theories on extinction: “as the years roll on and the swamps dry up and there is no food left for this grass-eating beast, you would see that they died off with no food in sight. Their short legs did not allow them to run very fast, and when the country went Volstead, just as with us, many were out of a job and so fared Mr. Dinosaurus.”²⁸ This was humorous, but drew links between the controversial legislation and the long-term environmental change which was often used to explain the end of the dinosaurs in this period.

There were also attempts to move the dinosaur into stage musicals and vaudeville shows. In 1931 it starred at New York’s Roxy Theatre in the final act of the “Fifty Million Years Ago” revue show.²⁹ The event culminated with Stone Age priests taking a “sacrificial victim” to an altar, at which point the dinosaur appeared to lift her offstage, apparently to be eaten. Although certainly spectacular—and innovative enough to feature in an article in *Popular Science*—this act was much less well-received than the department store displays. On the one hand, the production values were criticized as “not so well done nor effective” and “probably not expensive.”³⁰ However, it was also due to the deviation from agreed scientific details. The review in the *New York Evening Post* stated the producer “was just a little reckless in having a dinosaur and a cave man on the stage at the same time” and that:

Moreover, the little girl, almost seven, who took us to the show insists that the prehistoric beast which rages there is a special kind of dinosaur known as the brontosaurus, and, therefore, unsuited to the role of eating a sacrificial virgin.

She bases this opinion on observations made at the American Museum of Natural History, an institution to which, at the age of three, she began applying the name of “The Bone House,” on account of the skeletons, spinal columns, skulls, and assorted bones on display in its vast halls.³¹

Public knowledge of prehistory was relatively high. *Everyone* knew that the Brontosaurus was a herbivore and lived long before “cave men,” and—while terrifying—it would not have eaten the

²⁷ “#4 Radio Talk,” Box 6, Folder 7: Loose Materials. M&D Records.

²⁸ “#3 Radio Talk,” Box 6, Folder 7: Loose Materials. M&D Records.

²⁹ “Prehistoric theatrical reviews and movies were becoming more common in this period, with a number being mentioned in Clark, *God—or Gorilla* (ref. 5), esp. 213–16 on meditations on the abduction theme.

³⁰ “Roxy NY, July 24,” no Publication or Date. Box 6, Folder 11, 51-66, 1930-1934. M&D Records.

³¹ Quoted in “Dolores, Last of the Dinosaurs,” *Display World*, September 1931. Box 2, Folder 19: The World a Million Years Ago (development), 1924–1932. M&D Records.

sacrificial maiden. A certain level of scientific credibility was needed even at the Roxy, and this had to be maintained to keep commercial appeal.

INSERT HERE: Figure 5: *Popular Science Monthly* (October, 1931). M&D Records.

The World One Million Years Ago

By the early 1930s, Messmore and Damon had exhibited their prehistoric animals across eastern North America. Where could they go next? An opportunity for an even more ambitious mix of education and spectacle arose with the Chicago World's Fair of 1933. Initially intended to mark the city's centenary, the fair's remit was broadened to the theme of "A Century of Progress" to increase its national and international appeal.³² Featuring futuristic architecture, electric shows, and optimistic visions of the future, the fair was intended to bring economic stimulation to the Depression-hit city, and promote a rebrand after Chicago's recent association with gangsterism and violence. The fair was also intended to be self-financing, and reflect a new economic ethos. Exhibiting companies and concessions were encouraged to pool resources and reinforce one another rather than compete, building a more collaborative and mutualistic form of capitalism.

For this event, Messmore and Damon proposed their exhibit, "The World A Million Years Ago," to show "progress" deep in the evolutionary past. The plans were for a huge dome measuring one hundred feet in diameter, filled with "giant prehistoric animals" in "scientifically correct scenes of geological history."³³ Starting with dioramas of human evolution, the displays then moved backwards into the Permian, with a sail-backed Dimetrodon eating a smaller Varanops. Then followed the reptiles of the Mesozoic, including a Pterodactyl, Triceratops, Stegosaurus, Tyrannosaurus, and Brontosaurus. Visitors then progressed to the Age of Mammals, first seeing a ground sloth trapped in tar ready to be pounced on by a sabre-tooth cat, and then Ice Age animals like the mammoth and woolly rhinoceros. Although the link was not explicitly mentioned, a giant "prehistoric gorilla," seemingly modelled on King Kong (from the film that had just opened in the movie theatres), was also included. After this, visitors emerged

³² The 1933–34 Chicago World Fair has been discussed in Cheryl Ganz, *The 1933 Chicago World's Fair: A Century of Progress* (Chicago: University of Illinois Press, 2012), Lisa Schrenk, *Building a Century of Progress: The Architecture of Chicago's 1933–34 World's Fair* (Minneapolis: University of Minnesota Press, 2007), Bill Cotter, *Chicago's 1933–34 World's Fair: A Century of Progress* (Chicago: Arcadia Publishing, 2015), and Robert Rydell, *World of Fairs: The Century-of-Progress Expositions* (Chicago: University of Chicago Press, 1993).

³³ "The World a Million Years Ago: Revised Building Plan," Box 2, Folder 20: The World a Million Years Ago (construction plans), 1930s. M&D Records.

into an Arctic scene, with walrus, polar bears, and other marine creatures, before exiting into the sunlight.

INSERT HERE: Figure 6: The World A Million Years Ago, *Popular Mechanics* 59, no. 6 (1933).
Box 7, Folder 4. M&D Records.

The total cost of the exhibit was \$326,000, with Messmore and Damon providing \$126,000, and the rest being raised through sponsorship. This was a lot of money, and 1.5 million attendees were needed to prevent a loss. The World A Million Years Ago was therefore designed to maximize footfall. Moving ramps would carry visitors along, and “on very busy days, the speed at which the floor moved, was increased slightly. Unwittingly, viewers couldn’t stay in as long as they could have on slower days.”³⁴ As well as the admissions charge (25¢ for adults, 10¢ for children), toys, guidebooks, postcards, and souvenirs were sold. In terms of both commercial and scientific presentations this was a major event: the budget was about half that of *King Kong* and Andrews’ Central Asiatic Expeditions (both of which cost around \$650,000); and the AMNH’s Department of Vertebrate Paleontology had a budget of \$80,000 for that year, with the museum’s exhibition halls being visited by 924,030 people.³⁵

Notably, Messmore and Damon were not the only exhibitors of prehistoric creatures at the fair. The Sinclair Refinery Corporation, an oil company which had been using dinosaurs in its promotional material for the previous fifteen years (and was soon to sponsor Barnum Brown’s paleontological excavations in Wyoming), was also exhibiting life-sized mechanical dinosaurs. These were set in an outdoor garden with ferns and “jagged, sharp-cornered stone,”³⁶ and featured a Brontosaurus, Tyrannosaurus, Triceratops, Hadrosaur, and egg-laying Protoceratops. The intention was for a spectacular exhibit which used dinosaurs to explain “some of the most interesting features connected with the manufacture and sale of Sinclair Opaline Motor Oil,” and “impress on the mind of the public the vast age of the crude oils from which Sinclair motor oils are made.”³⁷

³⁴ Francis B. Messmore, “The History of ‘The World A Million Years Ago,’” Box 2, Folder 19: The World a Million Years Ago (development), 1924–1932. M&D Records.

³⁵ *Sixty-Fifth Annual Report of The American Museum of Natural History* (1934): on 18 and 21.

³⁶ “The Sinclair Exhibit at the Century of Progress,” Box 422 Folder 1-13608: Sinclair Refining Co., 1928–1933. COP1: Series 1: General Correspondence, 1927–1937. Century of Progress Records. University of Illinois, Chicago, Library (Hereafter CoP Records).

³⁷ “The Sinclair Dinosaur Exhibit,” Box 422, Folder 1-13608: Sinclair Refining Co., 1928–1933. CoP Records.

The Sinclair dinosaurs, which had been developed specially for the fair by P. G. Alen, were however somewhat less sophisticated than Messmore & Damon's creations. Whereas Sinclair's dinosaurs had limited head and limb movements, the prehistoric animals in *The World A Million Years Ago* drew on Messmore & Damon's long experience in creating prehistoric spectacles. As with the department store literature, the promotional material emphasized how they combined the modern and the primeval. An article in *Popular Mechanics* lurched between discussions of technical wizardry and prehistoric ferocity: "Perhaps you consider a prehistoric zoo a bit incongruous among the fair's modernistic structures and scientific exhibits depicting the dramatic story of man's achievements. As a matter of fact, these colossal creatures are as modern as the airplane because each animal, while apparently alive, is entirely mechanical."³⁸

Messmore & Damon not only relied on technical sophistication to draw in the crowds, but also publicity drives and raising "Ballyhoo," an expression used in both Messmore & Damon's internal press coverage and reports on the exhibit. They made sure that *The World A Million Years Ago* maximized attendance, often in ways which contravened the regulations of the Fair. Initially, attendance was quite low and so—against the contract—a series of prehistoric models were erected outside the dome, to give more obvious advertising. Other publicity stunts kept *The World A Million Years Ago* in the press. In April, two robotic Neanderthals named Mr. and Mrs. Gugu were flown for the display—and press reports were filled with images of these two cave-people about to board an airplane. The aviator Amelia Earhart was also specifically photographed visiting the exhibit, posing with the giant gorilla and Brontosaurus.

INSERT HERE: Figures 7 & 8: Amelia Earhart and the Prehistoric Gorilla, and the Nudist Wedding. Box 24: Photographs. M&D Records.

However, *The World A Million Years Ago* did not just depend on spectacular "Ballyhoo." Like Messmore & Damon's earlier attractions, it was also intended to be educational. New scientific finds were closely incorporated. The sloth stuck in tar was not only reminiscent of the famous tar pits at Rancho La Brea, but was even named "Death Trap of the Ages," taking its name from one of the first publicizations of the site by the paleontologist John Merriam.³⁹ Additionally, one of the animals which featured most prominently was the *Platybelodon*, or "shovel-jawed elephant." This was a new species discovered in the AMNH's Central Asiatic

³⁸ H. W. Magee, "The World One Million Years Ago," *Popular Mechanics* 59, no. 6 (1933): 824–29.

³⁹ John Merriam, "Death Trap of the Ages," *Sunset Magazine* 21 (1908): 465–75,

Expeditions, and first published on in June 1932.⁴⁰ It featured widely in the expeditions' publicity, and also became a key feature in Messmore & Damon's show (including a whole Pathé News Report), as it brought new scientific finds into its display.

Links with the American Museum of Natural History did not stop there, with most of the animals in *The World A Million Years Ago* paralleling its exhibits. This was particularly apparent in the human evolution dioramas, which moved through apelike Pithecanthropus, Piltown Man inventing tools, Neanderthals burying their dead, and finally the advanced Cro-Magnons with art and high mental life. This directly paralleled the narrative laid out in the AMNH's Hall of the Age of Man opened in 1923. This exhibit, which dramatized Henry Fairfield Osborn's racialized conception of human development, has been analyzed in a range of works.⁴¹ Its redeployment in animatronic form at this mass public event shows the transmission of Osborn's model into more commercial contexts far beyond New York City.

The presentation of scientific information was carried into the two guidebooks which accompanied the exhibit. The first was a black-and-white affair compiled by Meta Messmore, while the second was a more lavish color production by Leon Morgan, a popular science writer.⁴² The illustrations in both recapitulated many AMNH displays, including Charles R. Knight's paintings of Triceratops fighting Tyrannosaurus, the sequence of human ancestors from the Hall of the Age of Man, and an extensive segment on the evolution of the horse. The level of scientific content in Morgan's guidebook in particular was fairly high. Although it avoided mentioning controversies, it gave clear explanations of changes in earth's history, describing the origins of life, the first creatures on land, the appearance of sealed eggs, dinosaur extinction, shifts in environment over the Tertiary, and a large centerfold spread on "Man Through The Ages."

INSERT HERE: Figure 9: Leon Morgan, *The World A Million Years Ago Souvenir Guide* (1933). Box 2 Folder 22. M&D Records.

⁴⁰ Roy Chapman Andrews, Walter Granger, and Henry Fairfield Osborn, "Platybelodon grangeri, Three Growth Stages, and a New Serridentine from Mongolia," *American Museum Novitates* 537 (9 June 1932).

⁴¹ Clark, *God—or Gorilla* (ref. 5), 110–16, 152–54, Ronald Rainger, *Agenda for Antiquity: Henry Fairfield Osborn & Vertebrate Paleontology at the American Museum of Natural History, 1890–1935* (Tuscaloosa: University of Alabama Press, 2004), 145–51, and most recently Marianne Sommer, *History Within: The Science, Culture, and Politics of Bones, Organisms, and Molecules* (Chicago: University of Chicago Press, 2016): 67–92.

⁴² Leon Morgan, "The World A Million Years Ago: Brochure." Box 2, Folder 22: *The World a Million Years Ago* (text by Leon Morgan), 1933. M&D Records.

The exhibit and guidebooks did not simply show a comforting story of progress or mindless spectacles of prehistoric violence. They also reflected more widely on humanity's place in the history of creation. Meta Messmore's guide emphasized developmental processes, although in a manner which did not commit to any particular mechanism, and indeed suggested a metaphysical force. It opened stating that the visitor:

will receive the thrill of a lifetime as he discovers himself a mere pygmy alongside some of the gigantic monsters of yesteryear He will marvel at Prehistoric Man as he visits them in their actual habitat back in the Stone Age. ... He will compare, reflect and meditate on the Biblical saying, "WHAT IS MAN." ... Out of a chaotic, nebulous, smoking mass, the Creative Power in the Universe has through the years, evolved the earth and its inhabitants as Modern Man knows it today.⁴³

Attendees were not just encouraged to marvel at spectacular animals, but to contemplate life's history. Morgan's guide was even more reflective, ending on a note of poignancy and doubt:

If we could see ahead into the future as well as we can into the past, there is no doubt that we would be surprised indeed at the changes in the world a few millions of years hence. Is the domination of man on the wane? Will he too disappear as did the early dinosaurs? Who will be the next rulers of the earth?

The questions are pure speculation. There is no answer.

Like the crying Brontosaurus in the Montreal essay competition, reflection on prehistoric monsters could be the source of great concern and mystery.

It is of course important to state that these relatively sophisticated messages were combined with much simpler interpretations, or more sensationalist promotional literature. The exhibition guides for example referred to the Pterodactyl as "the largest bird that ever learned to fly,"⁴⁴ and the exhibition itself featured chronological misplacements, such as the Glyptodon being located in the Mesozoic. A particularly notable example was the Pathé News Short "Before History," presenting a tour of the exhibit.⁴⁵ This followed the animals almost at random, missing out the chronological construction of the display, and garbled a number of descriptions: the Triceratops was rather nonsensically described as "something like a horned rhino;" the Pterodactyl was a "gigantic ancestor of the bat family;" and "the world-famed dinosaur" was the

⁴³ "The World A Million Years Ago: A Century of Progress International Exposition, Chicago 1933." Box 3, Folder 1: Chicago World's Fair (The World a Million Years Ago), 1933. M&D Records.

⁴⁴ Ibid.

⁴⁵ "Before History" (July 13, 1933), British Pathé Archive, Film ID: 1612.01, <http://www.britishpathe.com/video/before-history/>.

“giraffe-necked terror of the swamps, with eyelashes like a movie queen.” Scientific display and sensationalism in some instances drew apart, and while this could generate interest, it could also be problematic in communicating details.

After the World’s Fair

The World A Million Years Ago was a hit within the Chicago World’s Fair, and the fair itself was a success, attracting a total of 39 million visitors and extending its run into 1934. To retain a sense of novelty, Messmore & Damon’s exhibit was renovated for the second season, moving further towards commercialism. The concession was rebranded “Down The Lost River,” and placed alongside their “History of Torture,” a chamber of horrors display. Down The Lost River had largely the same models, although some of the modern animals were removed and an “alligator island” was added, featuring “natives beating tom-toms” (again possibly attempting to resonate with the popularity of *King Kong*). Rather than proceed along a moving walkway, visitors would now board “an explorer’s boat, pushed by a Neanderthal man, and float down a ‘lost river’ through the pre-historic world of a million years ago,” eventually emerging “into a seeping, crawling, mysterious jungle, full of animated animals of a forgotten age, moving, snarling, raging in pre-historic slime and confusion.”⁴⁶

Further attempts at “Ballyhoo” were attempted. The most controversial was a “nudist wedding,” which became even more dramatic when the animatronic Glyptodon malfunctioned and caused one of the nudists to fall into the lost river.⁴⁷ However, the general impression was that this second season was less successful than the first, with attendance overall being lower and repeat visitors rare. Messmore & Damon requested that they be granted a higher share of the takings, and claimed to the fair organizers that Down the Lost River “was an awful flop for us,”⁴⁸ running up a loss at the end of its five-month run.

Although this continued exhibit was apparently unsuccessful, the fair as a whole significantly bolstered Messmore & Damon’s regular business of loaning models, and encouraged further experimentation. They attempted to establish The World A Million Years Ago as a permanent attraction in New York at the Warner Brothers Theatre on Broadway in 1934. This gained a great deal of initial publicity, under the tagline “Bigger than Barnum’s

⁴⁶ “Press Release: Lost River, 16 April 1934.” Box 321, Folder 1-10210: Messmore and Damon, Inc., ca. 1933–1934. CoP Records.

⁴⁷ Louis Hochman, “Man of the Monsters,” *Mechanix Illustrated*, May 1947. Box 8, Folder 8–9: Scrapbook, 1932–1947. M&D Records.

⁴⁸ John L. Davis to Louis Skidmore, 30 January 1935. Box 321 Folder 1-10210: Messmore and Damon, Inc., ca. 1933–1934. CoP Records.

Biggest! Better than Barnum's Best!"⁴⁹ A *Paramount News* short, "Stone Age on Broadway," was even presented by Roy Chapman Andrews, who stood in front of an animated Stegosaurus expounding on the authenticity of the reconstructions. However, the Broadway show ended after a very short run. Some reports indicate that this lack of success was due to the staging. The creatures were placed in the theatre some distance from the audience, and many assumed it was a movie rather than animated models. Adverts later emblazoned with "Not a motion picture!" appears to have had relatively little effect. It seems as if spectators needed to see the animals up-close and interact with them for them to be appealing. From a distance, they were not up to the special effects standards that audiences had become used to from feature films such as *King Kong* and *The Lost World*.

INSERT HERE: Figure 10: Cover and Sheet Music to "The World A Million Years Ago," Scott, Eisner & Co. (1936). Box 2 Folder 24. M&D Records.

Department store exhibits remained the most successful use. Over the holidays and spring of 1934–35, the World A Million Years Ago was exhibited in Pittsburgh and Philadelphia, and later at smaller expositions like the Pan-American Fair in Dallas, "the Little World Exposition" in Detroit, and the Michigan Exposition in 1936. These continued runs were paralleled by increased merchandising. Two sets of toys, the "reptile group" and "mammal group," were on sale from 1933 onwards,⁵⁰ and there was even a "World A Million Years Ago" musical number, released in 1936.⁵¹ Experimentation and diversification remained an important aspect of Messmore & Damon's marketing strategy.

The World A Million Years Ago also went overseas, being exhibited in Paris at Luna Park in summer 1935. This was widely reported in the French press, and offers an interesting comparative example of how prehistoric creatures were discussed in Europe as opposed to the United States. The Paris reports were similar to the American ones, marveling at the ingenuity and realism of the machinery, and the size and variety of the animals. The correspondent for *Paris Soir* noted it was "the most striking thing to be seen in Paris ... and will be found very

⁴⁹ "World A Million Years Ago." Box 2, Folder 23: The World a Million Years Ago. M&D Records.

⁵⁰ Messmore & Damon's "World A Million Years Ago: Mammal Group" and Messmore & Damon's "World A Million Years Ago: Reptile Group." Box 2, Folder 18: The World a Million Years Ago, 1933. M&D Records.

⁵¹ "The World A Million Years Ago." Box 2, Folder 24: The World a Million Years Ago (sheet music), 1936. Box 7, Folder 3: Scrapbook, 1930–1941. M&D Records.

instructive.”⁵² The French reports differed however in their emphases, linking more with national traditions in paleontology. The American dinosaurs were presented as impressive (with the “Brontosaurus” sometimes being called the “Diplodocus”—a more familiar sauropod in Europe), but more attention was paid to the mammoths and Ice Age humans, which were well-known from French sites. One report, “Luna Park avant le Deluge”⁵³ even recapitulated the title of one of the most influential French popularizations of prehistory, Louis Figuier’s *La Terre avant le Déluge* of 1863. The French reports also made links between dinosaurs and modern technology, but in a different tone. The review *Gringoire* noted that: “It is however—alas!—hardly necessary to go to Luna Park to see such a poignant spectacle. It is the same in all the roads in France, in all the roads of Paris, filled with ferocious mastodons of three, five or ten tons. The arrogance of the drivers of automobiles, trucks and other things is an unacceptable danger.”⁵⁴ Similar connections to those in the American context were drawn, but the relationships to modern technology was quite different. Transport and motorcars were conceptualized as much more threatening in the French periodicals than in the United States, where they were more likely to be seen as signs of progress.

Further attempts to build the World A Million Years Ago brand connected it with science fiction—although failed to get off the ground. A film synopsis from 1936 indicates that Messmore & Damon were attempting to get into the movies.⁵⁵ The long and fairly torturous plot saw Professor Norton, the paleontologist Dr. Adams, and “young and beautiful” socialite Gale Kenwood travel to a strange planet, “in the same state of development as was our world a million years ago,” full of prehistoric animals and a dinosaur-riding civilization. After a series of adventures, Professor Norton teleported back to earth using television waves, accompanied by a selection of dinosaurs, which were promptly placed in the Bronx Zoo. This had the effect of inspiring world peace: “The Earth is a scene of great rejoicing. The depression, that talk of war, the differences of nations, and the political complexities of the world are forgotten in the general excitement caused by the successful conclusion of Professor Norton’s epic experiment. All nations by tacit agreement proclaim the following week an international holiday, to celebrate the crowning achievement of radio and television.” This connects with the more idealistic agendas of

⁵² Jean Rollot, “Les animaux préhistoriques à Luna-Park,” *Paris Soir*, July 18, 1935. Box 7, Folder 3: Scrapbook, 1930–1941. M&D Records.

⁵³ “Luna Park Avant Le Déluge,” *Candide*, 1 August 1935. M&D Records. Box 7, Folder 3: Scrapbook, 1930–1941. M&D Records.

⁵⁴ Jacques Deval, “Sept Jours Sept Nuits,” *Gringoire*, August 16, 1935. Box 7, Folder 3: Scrapbook, 1930–1941. M&D Records.

⁵⁵ “The World A Million Years Ago,” July 16, 1936. Box 2, Folder 25: The World a Million Years Ago. M&D Records.

the prior displays, that knowledge of the prehistoric world could improve the mind and cure social ills. The movie script only saw this being partially realized however, as the dinosaurs soon escaped, rampaged through New York, and then swam out to sea, never to be seen again.

Another unrealized proposal was renovating The World A Million Years Ago for the New York World Fair of 1939–40 within the new framework of “The Adventures of Flash Gordon.”⁵⁶ Visitors would “board Flash Gordon’s interplanetary Rocket Ship ready for the great adventure, a trip to the Planet Venus.” As Venus was a younger planet than Earth, it still contained prehistoric animals (an interesting justification, indicating ideas that evolutionary development followed the same track, wherever it occurred). Visitors would then be guided by an actor playing Flash to see the Dimetrodon fighting Varanops, Pterodactyl, Brontosaurus, and “four different types of people.” They would then visit a high-tech Martian city (the Martians having colonized Venus several millennia previously) before being deposited back on Earth, “more than satisfied that our trip has been thrilling, exciting, entertaining, and educational and that we were well taken care of by Flash.” The plans for this were well-developed, and featured in a preview of the fair in *Popular Science*.⁵⁷ However, it seems to have fallen out of production, and Messmore & Damon contributed to the “Old New York” display instead, recreating (possibly appropriately) P. T. Barnum’s museum, complete with the Cardiff Giant and animatronic Jumbo the elephant.

The Second World War bought an end to further experimentation. Messmore—who had bought Damon out of the company in the late 1930s—tied his work with the war effort, using his model-making skills to produce dummy paratroopers, which were dropped during the invasion of France. Also important were propaganda displays. One segment from the history of torture for example was redesigned as “Nazis Sterilize Women.”⁵⁸ And in a 1942 New York Parade raising money for war bonds, the Amphibious Dinosaur Brontosaurus was given a suit of armor to become “The Axis War Monster,” ridden by a barbarian figure in a horned helmet and accompanied by extracts from Adolf Hitler’s speeches blasted out by loudspeaker. After the war, the World A Million Years Ago continued to be exhibited, both in the United States and in Japan, although with ever decreasing frequency. Finally, when Messmore & Damon closed in the late-1970s, the prehistoric models were dispersed, being bought by fairs and private collectors.

⁵⁶ Box 2, Folder 28: The Adventures of Flash Gordon in the World of Tomorrow (1930s). M&D Records.

⁵⁷ “World Fair Thrills,” *Popular Science* 134, no. 3 (1939): 73–77, on 75–76.

⁵⁸ “Santa Claus Maker,” no source, December 1949. Box 1, Folder 6: Newspaper and Magazine Clippings, 1925–1996. M&D Records.

INSERT HERE: Figure 11: The Dinosaur as the “Axis War Monster.” Box 7 Folder 5. M&D Records.

Conclusion

In many ways, Messmore & Damon’s prehistoric animals show in microcosm how paleontology spread through US culture in the 1920s and 1930s, as it moved across a range of media and genres, including department store displays, parade floats, expositions, merchandising, theater shows, and even projected film scripts. Notably, these were not simply crude commercial spectacles, but also depended on invoking scientific theories. Dinosaurs and other prehistoric creatures were appealing both due to their terrifying and “monstrous” nature, but also their ability to promote “education” and social cohesion, and inspire reflection on development, life, and environmental change. The models were also interesting in themselves, with technology creating a simulation of life, and with interaction being key to their success.

Messmore & Damon’s displays emphasize the synergistic links between paleontological science and commercial spectacle in this time, and relate in interesting ways to the arguments by Clark and Brinkman that scientists and educationalists continually wrestled with sensationalism and science. Through examining Messmore & Damon, we see that something similar also affected the more commercial prehistoric presentations, which also often attempted to balance science and spectacle to maintain appeal. The displays frequently stated a commitment to education and improvement, and often contained fairly high-level explanation. Commercial spectacle could therefore be an important way in which theories, images and creatures spread beyond the museum. Tensions certainly existed, and at times the presentations either omitted or simplified contemporary scientific ideas, such as in the Roxy Musical or the second season of *The World A Million Years Ago*, which moved more directly to overt commercialism. However, it is important to note that it was precisely these times when the exhibits could be said to have “failed,” which indicates the importance of the linkage for public appeal—even if this was not always followed through.

The terms and presentations of Messmore & Damon’s creations also show wider points around understandings of Earth’s deep history in this period. Size and the potential for superlatives were a key part of the appeal of sauropods in particular. However, this was not the only reason for interest. Violence and monstrousness were important for the appeal of prehistoric animals, but so was empathy and conceptualizations of longer developmental trajectories. Whether this was the Brontosaurus in Montreal crying over the loss of his swamp, the progressive evolution of human types in *The World A Million Years Ago*, the placing of

dinosaurs and mammoths on a continuum with modern automobiles, or the notion that bringing dinosaurs to Earth could solve the Depression and interwar crisis, the display of animatronic prehistoric animals became an important means of understanding change and development in the world.